



Evaluating Recently Developed Reanalysis Projects

CFSR, MERRA and ERA-Interim

Time series of global precipitation

Impact of Observation Systems

Bob Kistler
IMSG/EMC/NCEP
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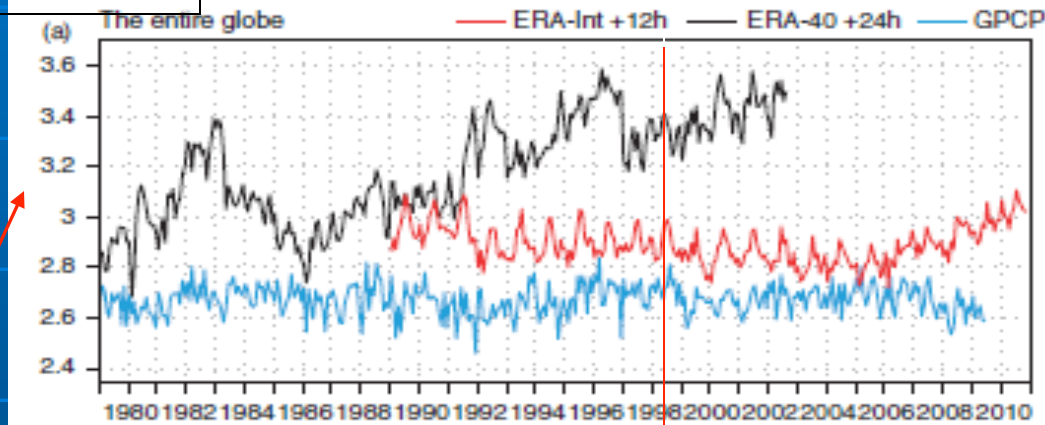
"From the Sun to the Sea... Where America's Climate, Weather, Ocean and Space Weather Services Begin"

Evaluating Recently Developed Reanalysis Projects

- One of the challenges to the interpretation of reanalysis time series is the impact of observing system changes, in particular:
 - SSMI (beginning in 1987)
 - AMSU_A (beginning in 1998)
- Demonstrate with the comparison monthly mean, globally averaged precipitation time series from:
 - NOAA/NCEP:CFSR
 - Saha, et al BAMS, 2010
 - ECMWF: ERA-Interim (ERA-I)
 - Dee, et al QJRMS, 2011
 - NASA/GMAO: MERRA
 - Basilovich, et al JCLim, 2011
 - GCPC (independent estimate)
 - <http://www.gewex.org/gpcp.html>
- Caveat – focus on the continuity of the time series not the absolute values!

ERA-I vs CFSR global precip

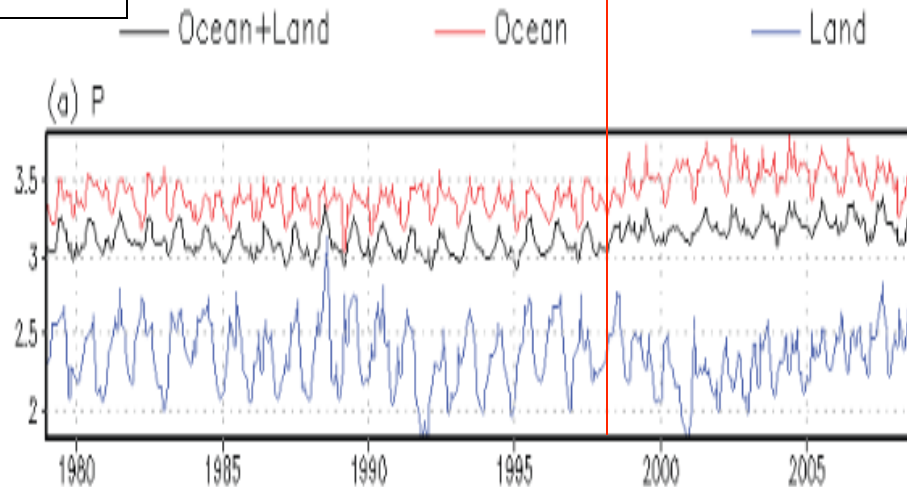
ERA-I



ERA-I plot
starts after
SSMI began
in 1987

Scales of
mm/day
differ

CFSR

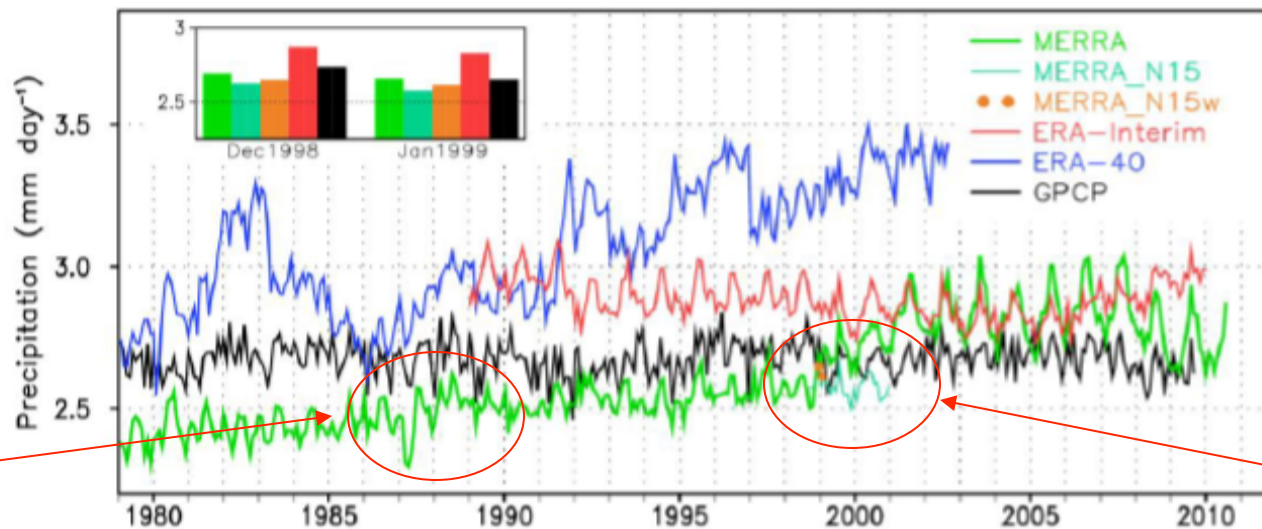


ATOVS 1998

CFSR did not
assimilate
SSMI

MERRA Global Precip.

Fig 18 in Basilovich, 2011



SSMI
start

MERRA
AMSUA
tests

AMSUA
start

FIG. 18. Time series of global monthly mean precipitation (mm day^{-1}) for MERRA, ERA Interim and ERA-40, compared against GPCP. In addition to the time series from the MERRA distribution, two short data withholding experiments are shown. MERRA_N15 is from an experiment withholding all AMSU-A data from NOAA-15, and MERRA_N15w withhold only the AMSU-A window channels, 1-3 and 15. For clarity, the inset shows the monthly mean values for December 1998 and January 1999.

Summarizing Instruments in ERA-I, MERRA, and CFSR

- ERA-I
 - Assimilated 7 ch's SSMI
 - Dropped AMSU-A Window ch's 1,2,3,15
- MERRA
 - Assimilated 7 ch's SSMI
 - All AMSU-A ch's
 - Tested impact of dropping window channels
- CFSR
 - no SSMI
 - All AMSUA ch's

NCEP CFSR-Lite

- T126 version of CFSR (T382)
- 2011 GSI + CFSv2 model
- Addresses lessons learned from CFSR
- Possible replacement system for NCEP/NCAR R1 of Kalnay, 1996 and Kistler, 2001
 - 1948 – 1978
 - 1979 –
 - Currently testing the ERA-I SSMI & AMSU-A configuration for 1998-1999